TECHNIQUE
FOR
Low Volt Generators
AND
Short Wave Generators

GARFIELD MEDICAL APPARATUS CO.
Manufacturers of
X-Ray, Short Wave and Low Voltage Generators
147 WEST 22nd STREET NEW YORK 11, N. Y.

PHYSICS

Low voltage currents are SINUSOIDAL, GALVANIC, INTERRUPTED GALVANIC, and FARADIC ranging from 0 to 250 volts.

The therapeutic use of electricity comprises those applications of electric power transformed into mechanical, chemical or physical action, as may be employed for the correction of diseased conditions. In the treatment of physical conditions particularly, electricity is employed exactly as it is for industrial uses, merely carrying power which is transformed into some other form of force within the structure into which it passes. In therapeutic use it is transformed into mechanical, chemical or physical action, and it is this resultant force which is actually employed as a medical or surgical instrumentality. One should not think alone of the agency by which this force is carried into the body, but rather of the effects which it produces when passing through.

Effects produced by the SINUSOIDAL, GALVANIC AND FARADIC CURRENTS may be divided into three groups: MECHANICAL, CHEMICAL and PHYSICAL.

Mechanical Action

Mechanical effects produced by low volt currents are those associated with involuntary muscle movements which are produced by the SINUSOIDAL CURRENT.

SINUSOIDAL CURRENT is delivered in two forms: Non-surging and surging.

The non-surging Sine Wave Current is a rapid alternating current of constant voltage or potential. This current has a wide range of and produced a constant agreeable contraction of muscle tissue. The degree of which depends on the strength of current being used. This continuous sinusoidal current induces a cellular activity. Its most valuable use is to produce short muscle contractions by stimulating nerve centers, controlled by a circuit-breaking switch on the handle of the electrode being used; and to relax muscle spasm when a sufficiently long application is maintained.

The continuous Sinusoidal Current is the ideal current for producing smooth, rhythmic muscle exercise and massage.

When any muscle or set of muscles fails to respond to the nerve impulse, which is its guide for action, it is because of some faulty function of the nerve itself, or impairment in the muscle involved. If, through injury or disease, muscular ability is impaired, and an attempt is made to restore normal function by some electrical or physical means, and if the process thus instituted be much more rapid than is normal for the affected part, then fatigue and exhaustion may follow. If, on the other hand, the process used to restore lost ability is much slower than normal, metabolism fails to assent itself.

Chemical Action

The chemical effects of low volt currents are associated exclusively with the continuous Galvanic Current. These include reaction to the current as it enters tissue at the positive pole, passes through from one electrode to the other and passes out at the negative pole. Commonly called positive and negative effects metallic electrolysis; ionization (ionic medication) sometimes called cataphoresis.

Action of the Positive Pole

The current enters at the positive pole, contracting tissue and causing vascostriction. It also relieves congestion and accumulates acid and oxygen.

Pain is due to pressure, immediate or remote. The positive pole of the GALVANIC CURRENT diminishes the blood supply by its contractile action, not only on the surface but in deeper tissue as well. Therefore, it can be depended upon to relieve pain in the acute stages of inflammation or a temporary congestion.

Action of the Negative Pole

The current leaving the tissue exits at the negative pole relaxes and softens the tissue, causing vasolidation and inducing congestion, increasing circulation and subsequent nutrition to the area being treated, produces alkaline reaction due to hydrogen concentration and softens scar tissue.

The negative pole dispels non-purulent effusions and extravasations by increasing circulation and stimulating absorption, and accumulates alkalies and hydrogen.

The Galvanic Current

The effect of this current on the tissue which it is brought in contact with is strictly chemical. It is rarely ever caused to surge as it does not produce muscular contraction.

In using the Galvanic Current *never* depend upon the sensation of the patient as a guide to current strength. The dosage given to produce a desired effect is measured in millamperes and ranges from 1 to 15 in the average work done. Watch the milliampere meter closely when using this current.

As previously explained, the Galvanic Current is a smooth, constant, direct current, passing in one direction—from positive to the negative pole. That there may be no mistake in using the correct pole, a polarity switch, plainly marked so that it may be seen at a glance is provided.

One of the two electrodes used in treating with the Galvanic Current usually has a smaller conducting surface than the other, and becomes the active electrode.

Great care must be exercised to connect the proper pole to the active electrode to obtain the desired result and the current strength required for the case on hand. Be sure all electrical connections are tight and cannot slip.

To test for polarity: Place cord terminals close together NOT TOUCHING on a piece of *Wet* litmus paper. Draw the two apart keeping firm contact with the paper. At positive pole the paper will turn pink—acid in reaction. At negative pole the paper will turn blue—alkaline in reaction.

Electrolysis

Interstitial Electrolysis is a process whereby tissue is dissolved, within a local area, by contact with a metal electrode to which the negative pole of the direct current is connected. At the same time the positive pole is connected to an indifferent electrodes placed anywhere on the patient's body, not too far from, and if possible opposite, the negative pole which in this case is the active electrode.

The current under these conditions enters the indifferent electrode (positive pole), passes through the intervening tissue and out at the active metal electrode (negative pole), which is in contact with the tissue, and which point the dissolving process takes place.

If a direct current is made to pass through a liquid composed of different elements, a chemical action is set up which results in a separating process of its ingredients. When such process is applied in a proper manner to living tissue, a local destructive action is inaugurated at the point of negative pole contact and interstitial electrolysis takes place. Here the degree of destruction depends on the strength of current and the length of time it is permitted to flow.

Galvanic Current in Strictures

Physicians are constantly seeking improved and more efficient methods of treating cervical stenosis, urethral strictures, rectal cases of stricture, etc. Those who have once used the Galvanic Current, in cases of stricture will never attempt treatment by other means, until first using this method. There are cases, of course, which prove to be strictly surgical, and in which the Galvanic Current would not be indicated, but these are very few compared with the large number which readily respond to electrolysis.

The physiological action of this current when passing thru living tissue is to elevate the temperature of the section thru which it passes. Where metal contact is made upon the skin of healthy, living tissue, a burning sensation takes place at either pole.

If a sufficiently strong current is used when two metal (pointed) electrodes are applied to a portion of the body, it will be found that at the positive point of contact there will be a constant contraction of the skin. If a sufficient amount of current is used, a burn will take place at this point, and will leave a scar, hard and dry in character, and more or less bleached, caused by a diminution of blood supply.

At the negative pole, with the same strength of current being used, the parts will became red and congested due to the increased blood supply, and if the current is made sufficiently strong, a burn will ensue, as at the positive pole. In this case it will be different in character, being soft, spongy and yielding, leaving an ulcerous scar difficult to heal.

It will, therefore, readily be seen that the current at the positive pole produces an astringent effect, and at the negative pole, a relaxing effect.

Anti-Hemorrhagic Properties

Observing, as we do, the astringent effect of the current at the positive pole, we can readily understand why the current applied through a metal electrode at that point of contact would relieve hemorrhage. Also, we can understand why the negative pole, when applied to a stricture, scar, or other fibrous tissue, will soften and dissolve it.

Metallic Electrolysis

Metallic electrolysis is a process by which certain metals are oxidized when placed in contact with a moist surface, at the positive pole. An inflamed mucous membrane is the usual field of application, and copper or zinc tip electrodes are commonly used.

The proper method of procedure embraces the use of metal-tipped electrodes, correctly conforming to the cavities in which they are to be used. For illustration, in a case of cervicitis, the operator would use the abdominal surface electrode as the indifferent one, attaching to it the negative pole. The positive pole should be attached to the metallic cervical electrode and inserted in contact with the mucous membrane.

In this case the electrode is of copper. A current of 5 to 10 ma. used for a period of about ten minutes, causing oxidation of the metal and forming an oxichloride of copper at the point of contact. The current flowing from a positive to negative pole causes this astringent to be deposited on the inflamed surface to be passed into the tissues sufficiently to have a more curative action than could possibly occur, were a solution of copper or other metal used. Care should be taken, not only that the insertion of the electrode be made without undue pain, but also that its removal may not denude the mucous membrane. To remove electrode, turn current off gradually, reverse polarity and increase again to half strength used, for two minutes. The negative pole will quickly release the tissues adhering to the electrode without having any counter effect on results obtained.

In the treatment of bleeding hemorrhoids, erosion of the cervix granular conjunctivitis and pharyngitis, metallic electrolysis produces the desired results much more rapidly than any other method. Greater care in the control of milliamperage, however, must be observed in the treatment of areas correspondingly more delicate.

The advantages of this method over local applications of sulphate of copper in stick or in solution, or zinc in paste or solution, or of iron insolution, are as follows:

First, the action of the metallic salt upon the diseased surface is more accurately localized, as, for instance, in the treatment of a deep sinus, a copper probe may be carried to its bottom and the copper salt deposited where most needed;

Secondly, drugs introduced into the system in a nascent state are much more active than in chemical combination;

Thirdly, the salts formed are driven into the tissues, rather than laid upon the surface of the mucous membrane, as in ordinary applications.

The technic of treatment is similar to that of any galvanocaustic application, save that necessarily the positive pole is always the active one, and the electrodes take the form of bulbs and needles of copper or zinc. These are the metals which seem to have the widest range of usefulness as therapeutic agents.

When astringent or sedative effects are desired in a cavity without the introduction of ions of metallic substances, such as copper or zinc, electrodes constructed of pure carbon are used.

Ionization or Ionic Medication

Ionization is a term applied to the breaking up of chemical substances by a Galvanic Current and the introduction into the tissues of the remedial or sterilizing agencies used by the polar attraction of the ions of the substance.

Useful substances which may be applied by ionization when the positive pole is connected to the active electrode are:

Copper, zinc
Lithium compounds
Copper, zinc and magnesium salts
Cocaine for superficial effect only
Quinine
Adrenalin (epinephrine)
Calcium chloride

When the negative pole is connected to the active electrode:

Iodine and its various preparations
(Lugel's solution, potassium iodide
Sodium chloride
Sodium salicylate

Leduc's table of velocities shows that different ions travel at varying rates of speed into and through the tissues. The chlorine ion travels almost twice as fast as a zinc ion, and this latter moves a trifle less quickly than the mercury ion. At least thirty minutes should be allowed for a drug diffusion. When using substances in solution, it is generally agreed that a solution of not more than two per cent gives the best results.

The Galvanic Current is one of the most valuable of any used in Physiotherapy. If the physician will once learn the action of this current in tissue adjacent to each pole he will at all times be able to determine indications for its use.

THE POSITIVE POLE (plus)	THE NEGATIVE POLE (minus)
Accumulates acid	Accumulates alkalies
Acts as vaso-constrictor	Acts as vasodilator
Relieves pain due to congestion	Relieves pain due to constriction or lack of blood supply
Stops hemorrhage	Induces hemorrhage
Increases tone	Relieves spasm
Ionizes (copper, zinc, cadmium)	Ionizes (salicylates, salts, iodine)

Some of the cases in which the Galvanic Current is commonly indicated are:

Amenorrhea
Chillblains
Cervical erosions
Dysmenorrhea
Leukorrhea
Menorrhagia
Neuritis
Otitis media
Pruritus ani
Sciatica
Stenosis of the cervix
Urethral strictures

and many other conditions in which equal results cannot be obtained by the use of any other method.

Physical Effects

This term is used, owing to the fact that these effects are neither strictly mechanical nor strictly chemical, but do combine mechanical motion simultaneously with the introduction of the thermal and polar effects of the Direct Current, when caused to surge. For example, the effect produced by a current of low milliamperage at the positive pole is to contract the tissue adjacent to the surface in contact. The effect produced at the negative pole is to relax the tissue adjacent to the surface in contact. Such effects, when current insufficient to produce decomposition or chemical changes within the tissue is being used, are considered PHYSICAL.

Therefore, the low volt current producing physical effects, as above described is the Pulsating Direct, non-surging and surging.

Interrupted Galvanic

This current is not only a current flowing in one direction from positive (plus) to negative (minus), but is also pulsating in character, in that it travels in successive impulses.

Because of its pulsating character it produces muscle contraction, and because it is also a direct current it produces the chemical reactions at its positive and negative poles, as does the Galvanic Current. It may, therefore, be described as one producing combined or Physical Effects.

The Interrupted Galvanic Current has one great advantage over the Galvanic for treating cases in which combination effects are required. It has a power of stimulation much greater than the Galvanic, which is a direct current without pulsating characteristics.

The Continuous Galvanic Current

The voltage and current strength of the Continuous Galvanic Current remains constant at any desired point, depending upon the position of the control lever.

This current passes in one direction, from positive (plus) to negative (minus) pole, and when applied to human tissue directly opposite effects are manifested at the two poles.

The Surging Interrupted Galvanic Current

This current is produced by a device causing surges with the same characteristics as previously described. This current produces the same muscle contractions and the physical effects before mentioned, simultaneously. It may, therefore, be used to produce muscle exercise, and at the same time by increasing circulation to supply nutrition to partially degenerated nerve and atrophic muscle structure, as indicated in paralysis.

The current strength used is usually determined by the visible action of the muscle tissue in circuit, being careful not to use a sufficient volume of current (milliamperage) to burn the patient at a point of contact.

The Interrupted Galvanic Current is indicated in Paralysis, Bell's Palsy Post-Operative Adhesions, Scar Tissue Involving Muscles and Tendons, Fibrous Tissues, Etc.

Electro-Diagnosis

The electrical testing of muscles and nerves has become a most valuable aid in the diagnosis of conditions where partial degeneration of the nerve or muscle fiber is suspected.

Electro-diagnosis may be defined as the use of a low voltage current of the required character to produce reaction of muscle and nerve tissue, the degree of which determines the extent of disability.

The reaction of degenerate tissue varies greatly according to the state of degeneration which has taken place. When a current is passed through a healthy muscle, it encounters not only muscle fibers but also nerve fibers lying about them. Most nerve and muscle fibers are electrically excitable, but as the motor nerves are much more so than muscle fibers, the contraction of the muscle is due to the impulse received from the stimulated nerve.

There are three currents best suited for electro-diagnosis—the Interrupted Galvanic Current, the Galvanic Current, and the Faradic Current.

The Galvanic and Interrupted Galvanic Currents increase the Sensibility of nerve response.

Faradic Current

Faradic Current is an intermittent, alternating current induced in the secondary winding of an induction coil. The therapeutic use of this current is to stimulate muscles and nerves.

The technique of electrical nerve stimulation is to first place the patient in a comfortable position, where the parts to be treated are well supported and relaxed. The area to be treated should be warmed with short wave treatment. A moist pad electrode is placed upon a part of the body where there are no muscle bellies either the spine or a remote part of the extremity under treatment are ideal. An Interrupter handle with small pad electrode moistened with saline solution is placed in middle of the motor points, as this area is where the muscle normally responds to the minimum amount of current.

Electrical Stimulation of Motor Points and Nerve Distribution As an Aid in Diagnosis and Treatment

The importance of one's ability to determine the actual functional activity of individual or groups of muscles by electro-diagnosis, for the purpose of determining the degree of paralysis, the reaction of degeneration, and in medico-legal conditions which are likely to arise in any physician's practice, cannot be overestimated.

The fact that all parts and organs of the body are sensitive to the electric current to a greater or lesser degree is well known, and also that this electro-sensibility may be definitely affected by disease.

Organs which are indurated or become affected by disease may be less sensitive to the current than normal, just as they are less sensitive to any other mechanical stimulation acting upon them.

Susceptibility of different patients to the application of electricity to the surface of the body will vary greatly.

In many cases of feigned disease, the patient's statement may be entirely ignored and the muscle made to respond to direct current stimulus if healthy, regardless of his will.

The olfactory, gustatory, auditory, and the optic nerves are specially susceptible to the action of the current as proven by the production of sound, taste, smell and flashes of light.

In attempting to ascertain the truth by electro-diagnosis, duplicate tests should always be made on healthy as well as the impaired side, a rule which applies to all parts of the body.

Some General Rules to be Observed in Electro-Diagnosis

The principal aim of this method is to localize the current of required density and strength upon parts of the body marked for investigation, avoiding, as much as possible, unnecessary excitation of the neighboring structures. It is extremely essential to the operator that he should use the same strength and character of current each time a test is made.

One exciting electrode only should be used for each muscle or nerve reaction expected, and while it is necessary to have the other electrode somewhere, to complete a circuit, it is desirable to place it so as to eliminate effects at its point of contact. This may be called the indifferent electrode and should be larger than the exciting electrode, which must be of the proper shape and size not to overlap adjacent tissue. The small-point electrode is undesirable, as the current is weakened by the small carrying capacity of the point, and the contraction not sufficiently definite and perceptible.

An electrode placed on a nerve exit or muscle motor point to determine the amount of excitation should be placed on the spot indicated, either by direct sudden contact or the current interrupted by interrupter handle electrodes.

Do not move the active electrode in an indifferent manner over the area under examination, as it is not only unsatisfactory but it is likely to give the patient an unpleasant muscle contraction.

For all the muscles about the face and neck, the indifferent or larger electrode may be placed over the lower cervical or upper dorsal vertebra and the various points tested with the active electrode.

In the examination of the arm the indifferent electrode may be placed over the nerve supply on the back and the active one over the nerve or muscle, or set of muscles, under consideration. If one muscle, for instance, only is involved, then the indifferent electrode may be fastened at the upper insertion of the muscle and the active one applied at the motor point below.

In the case of hand disability the indifferent electrode can be placed over the flexors at the elbow, and the various motor points examined. The same applies to both the flexors and extensors.

In the examination of the thigh and leg, the same technic is carried out, the indifferent electrode being placed over the sacrum and the active electrode applied to the motor points.

In all cases it is usually more satisfactory to use the negative pole, as more pronounced reaction will be observed.

Those who are not familiar with the action of the Faradic Current would do well to practice upon themselves, that they may become familiar, not only with what may be expected, but also the amount of current necessary to bring about the contraction of a healthy muscle. After such experience comparisons are more easily understood.

A. Total Reaction of Degeneration (RD)
  1. No nerve response to galvanic or faradic current.
  2. Muscle responds to galvanic current, but requires more current.
  3. Muscles respond slowly.
  4. Motor point displaced toward the periphery.
B. Partial Reaction of Degeneration (RD)
  1. Nerve response to galvanic current.
  2. Normal equal single rapid contraction when current is interrupted.
  3. Partial (RD)—Diminished response.
  4. Full (RD)—No response.
C. Muscle response to Galvanic Current
  1. Normal rapid contraction when current is interrupted.
  2. Partial (RD)—sluggish contraction.
  3. Full (RD)—slow response.
D. Significance of RD
  a) Complete nerve section.
  b) Compression of nerve.
  c) Nerve degeneration after interstitial sclerosis.
  d) Lesion in anterior horns of spinal cord.
  e) Changes in peripheral nerve endings.

Conditions in which RD may occur: Anterior poliomyelitis; anterior horn involvement occuring with syringomyelia, new growths, disseminated sclerosis, hematomyelia, transverse myelitis.

Conditions affecting anterior spinal roots and adjacent structures, including traumatism, syphilis, tumors, tuberculosis or malignancy, complete or partial division bruising or pressure of peripheral nerves; also, poisoning with lead, alcohol, etc., and following infections, including diptheria, influenza, etc. Changes in electrical reactions.

Increased reaction may occur soon after the onset of disease affecting the spinal cord, hemiplegia, nerve injuries.

Decreased reaction may follow muscle atrophy due to disuse from any cause; the later stages of paralysis agitans, hemiplegia and tabes.

VALUE OF RD AS TO PROGNOSIS: It is said that in such conditions as infantile paralysis, paralysis of the facial nerve following exposure, paralysis of extremities, a test for RD about 10 days after onset showing no RD, recovery may occur in from three to six weeks; if RD is partial, 6 to 14 weeks; if RD is complete six months to a year at least. The test however is not infallible, but of value in forming a prognosis.

APPLICATION OF LOW VOLTAGE CURRENT

General Suggestions

ELECTRODES: Except when metallic electrolysis is desired, as in the use of soluble metals such as zinc, silver, iron, and copper, on mucous or denuded surfaces, always, when using Pulsating Direct or Galvanic Currents, cover the electrodes with gauze or cotton well moistened either with water or, if ionization is desired, the indicated solution, and be sure to keep well moistened throughout the treatment to avoid irritation or burning.

The asbestos canvas covered electrodes with rubber back do not need to be covered with gauze or cotton, but must be well moistened clear through before using, and kept moistened.

When using the Galvanic and Pulsating Direct Currents the electrode producing the desired effect, usually the one nearest the lesion being treated, should be smaller than the indifferent electrode. For instance, in treating cases involving the digestive or genito-urinary tract, the active electrode is placed on or near the lesion, while the larger electrode is placed on the abdomen or back as may be indicated.

When using the Sinusoidal Current it is not essential that the electrodes be covered with moist gauze or cotton, as chemical and polarity effects are absent. In most cases, however, the smaller electrode is placed near the area under treatment.

Bipolar rectal and vaginal electrodes are not used with the Galvanic or Direct Currents, except that they may be so used as a single pole electrode if covered with moistened Gauze or cotton, and the other pole is connected to a second electrode.

In all cases be sure that there are no small or sharp metallic points on pads used in contact with the surface treated, as electrolysis will occur with destruction of tissue.

Make sure that all areas covered with electrodes are thoroughly cleansed before application is made, as otherwise irritation or burning may occur due to the action of the current on certain drugs and chemicals, or the concentration of current in metal particles in contact with the skin.

CURRENT: Begin all treatments and make all changes from one current to another with current intensity at ZERO to avoid disturbing the patient. Do not (a) remove electrodes, (b) disconnect electrodes, (c) change polarity, or (d) turn off the current until the current has been slowly brought to ZERO. Do not produce too intense or too many muscle contractions so as to overtire feeble muscles. Discontinue treatment if patient complains of pain or burning. Make required adjustments in application or current strength before proceeding with treatment. As a rule, less current is required for arms and hands than for legs and feet. Neck and face require least of all.

ABSCESS:

POSITIVE GALVANISM: Use a 2 per cent solution of zinc sulphate with a current to the comfortable tolerance of the patient for 15 minutes. The positive pole is electrode No. 10, the negative pole the usual well moistened pad, located as nearly opposite as possible.

ADHESIONS:

Post operative, intra-abdominal and pelvic adhesions may be prevented by using the Surging Sine Wave Current as soon as possible after wound is healed and acute symptoms subside, thus eliminating the long continued use of abdominal supporters.

Technique: Surging Sine Wave Current
Surface electrode about 4 x 8 on back opposite wound
Surface electrode, about 3 x 3 over wound
Set surge indicator at about 15 surges per minute.
Current strength: sufficiently strong to cause at first mild contraction, gradually increasing strength with each successive treatment depending on the condition of the wound and the comfort of the patient.
Time of treatment: 10 minutes
Frequency of treatment: 3 times weekly

Treatment of adhesions already formed:

Technique: Pulsating Galvanic Current with or without surge
Surface electrode about 4 x 8 on back (P)
Surface electrode about 3 x 3 over scar (N)

If surge is desired set surge indicator at about 15 surges per minute.
Current strength: 10 to 15 Mils., determined by the tolerance of patient.
Time of treatment: 15 minutes
Frequency of treatment: 3 times weekly

AMENORRHEA

Unmarried Women

Technique: Pulsating Galvanic Current with or without surge
Surface electrode about 4 x 8 over sacrum (P)
Surface electrode about 3 x 3 over lower abdomen (N)
If surge is desired, set indicator between 8 and 16 surges per minute.
Current strength: 8 to 12 Mils.
Time of treatment: 20 minutes
Frequency of treatment: 3 times weekly

Married Women:

Technique: Non-surging Pulsating Galvanic Current
Surface electrode about 4 x 8 over abdomen (P)
Vaginal nickel ball electrode covered with cotton, well moistened with 2% nickel sulphate, in place (N)
Current strength: 5 to 10 Mils.
If surge is desired, set indicator between 8 and 16 surges per minute.
Time of treatment: 20 minutes.
Frequency of treatment: 3 times weekly.

ANEMIA

Technique: General ultra-violet radiation, followed by stimulation with Surging Sine Wave Current
Surface electrode about 3 x 3 over abdomen
Surface electrode about 4 x 8 over dorsal spine
Set surge indicator on 35 to 40 surges per minute
Current strength: patient's toleration
Time of treatment: 10 minutes
Frequency of treatment: 3 times weekly

ANKYLOSIS, Partial

Technique: Short wave to thoroughly heat the tissue and increase circulation, followed by Surging Sine Wave Current.
Surface electrode to cover area on each side or above and below joint
Set indicator for surge between 30 and 40 per minute
Current strength: sufficient to deeply massage all musculature and produce motion if possible.
Time of treatment: 10 or 15 minutes.
Frequency of treatment: 3 times weekly

APHONIA:

This condition is often quickly relieved by the application of Positive Galvanism to the occiput with a small Negative moist pad over the larynx, using 5 to 8 milliamperes for 10 to 20 minutes. Rapid Sinusoidal current is more effective when used to the point of toleration. In many cases by using a fairly strong Rapid Sinusoidal and then suddenly interrupting it causing a shock, you get a resultant shriek from the patient, and the voice returns. Use handle and No. 12 felt disc (moist), electrode No. 15.

ARTHRITIS:

A condition usually the result of a foci of infection more often than not, traceable to the colon.

In such cases when diagnosis discloses constipation, treatment as for intestinal strain (see Stomach, Dilation and Ptosis of) and follow with local applications to the joints as follows:

Technique: (1) Short wave followed by Surging Sine Wave Current
Small surface electrodes about 3 x 3 on opposite sides or above and below joints

Set surge indicator on about 15 surges per minute
Current strength: to comfortable toleration
Time of treatment: 15 minutes
Frequency of treatment: 3 times weekly

Technique: (2) Use Galvanic Current
Place well moistened pad electrode about 3 x 3 on the affected area (N)
Surface pad electrode about 4 x 8 on another portion of the member treated (P)
If painful, reverse polarity
Current strength: to tolerance
Time of treatment: approximately 20 minutes
Frequency of treatment: every other day

Joints that are immobile, due to fibrous adhesions respond to sodium chloride ionization. Splendid results in gonorrheal arthritis. Galvanism affects absorption in rheumatoid arthritis.

THE USE OF MECHOLYL IN ARTHRITIS

Oliver Abel, Jr., M.D.
St. Lois

Reprinted from *The Journal of the Missouri State Medical Association*, September, 1935, pages 351-353

The correct evaluation of a new therapeutic measure is always difficult and in a disease which has as many factors influencing it as has arthritis it is particularly so.

When we consider the multiplicity of factors which enter into this disease the need for concentration and specialized care for rheumatic patients and especially for the relief of pain becomes all the more obvious. It is the latter, i. e., the relief of pain, with which we are concerned in this paper. Space does not permit a discussion of the many types of treatment and therapeutic aids for this condition. The good results that we have obtained with the use of mecholyl has prompted us to report our cases. Mecholyl is acetyl, beta, methylcholine chloride. It produces effects similar to those produced by stimulation of the parasympathetic nerves. It slows the heart, lowers blood pressure, constricts the bronchioles, increases glandular activity and intestinal tone, stimulates peristalsis, and dilates the peripheral vascular system. The latter action makes it useful in arthritis inasmuch as circulatory disturbances are believed to play an important role in chronic arthritis and frequency accompany and aggravate the condition. The effects of mecholyl may be instantly abolished by atropine. In order to avoid the general effects of the drug and to concentrate its action at a local site, we employed mecholyl locally by the method of iontophoresis.

The therapeutic effect of this form of treatment might be explained by the deposition of the drug in the superficial tissues and its slow absorption from there giving a prolonged slight general vasodilation, combined with a pronounced and prolonged local effect.

The characteristic symptoms noted after treatment are increased skin temperature and sweating which continue for six to ten hours, and a slight diffuse redness.

While such symptoms as increased salivation, sweating, and slight weakness are very occasionally noted by the patient they pass off quickly and in no case were any unpleasant or alarming symptoms observed.

Kovacs[*] reported a series of cases in which mecholyl was used by the method of iontophoresis. He noted the best results were obtained in rheumatoid arthritis, 95 per cent of the cases showing improvement. Good results, however, were obtained in many cases of the osteo-arthritic type. In both types of arthritis he reports that where the patient had definite swelling there was a reduction of the swelling. Alleviation of pain was prompt and increased mobility of the joints was noted.

The method used is as follows: The affected joint is wrapped with a piece of sheet asbestos which has been saturated in 1/5 of 1 per cent solution of mecholyl. This is covered tightly with a piece of blocked tin which is kept in place with an elastic bandage. The blocked tins is connected to the positive pole of the galvanic machine. The negative pole may be applied to the buttock, thigh or calf of the leg. Several joints may be treated at one time simply by connecting the several joints treated to the positive pole. The current is turned on to between 25 to 30 milliamperes and kept on for between twenty-five and thirty minutes. The number of treatments necessarily varies. In the beginning treatments may be given once a day and gradually reduced to one or two times a week or longer depending on the patient. As will be noted in table 1 some of our patients have remained free pain for as long as two to three months without treatments. Following is a summary of our cases:

---

[*] Kovacs, Joseph: The Iontophoresis of Acetyl-Beta-Methylcholin Chloride in the Treatment of Chronic Arthritis and Peripheral Vascular Disease, Am. J. M. Sc. 188:32 (July) 1934.

We have used this treatment in fifty one cases. There are twenty-nine cases of osteo-arthritis, eleven cases of rheumatoid arthritis, two cases of the Marie Struempell type of spine condition and nine cases of myositis and neuritis.

Of the twenty-nine cases of osteo-arthritis, twenty-six or 90 per cent experienced definite relief of pain. They were chiefly of the spine and some of them were having symptoms of involvement of the cervical spine which is ordinarily very troublesome to the patient and very hard to relieve with the usual measures in vogue.

Two cases of Marie-Struempell disease showed no improvement.

Ten of the eleven cases of rheumatoid arthritis showed definite improvement both in the relief of pain and lessening of the swelling.

All nine of the myositis and neuritis cases showed improvement.

How long these cases will go in the future without treatment or what changes in the joints from a pathological standpoint will take place I am unable to say at present.

This method is certainly not to replace the usual treatment directed to the underlying cause of rheumatism, namely the correction of foci of infection, metabolic disturbances, etc., but is merely to be used as a means of giving relief of the pain.

Our cases reported were all chronic. We have had no experience in the use of mecholyl in acute joints or in gonococcal arthritis.

SUMMARY

1. Mecholyl given by iontophoresis increases capillary flow as evidenced by increased redness of the area treated.

2. Mecholyl iontophoresis was used in 51 cases of osteo-arthritis, rheumatoid arthritis, myositis and neuritis giving a 90 per cent relief in the cases of arthritis and 100 per cent relief in the cases of myositis and neuritis.

3. Two cases of Marie-Struempell disease showed no improvement.

ASTHMA

When no cause is discovered, or when the cause has been treated by usual medical procedures, the following technique will relieve the spasm with subsequent disappearance of symptoms.

Technique: Non-surging Sine Wave Current
Surface electrode about 3 x 3 over sternum
Surface electrode about 4 x 8 over cervical vertebrae
Current strength: comfortable toleration
Time of treatment: 10 to 15 minutes
Frequency of treatment: daily or more often as required

When emphysema is present because of relaxed longitudinal muscles, the Surging Sine Wave Current will often give relief.

Technique: Surging Sine Wave Current
Surface electrode about 4 x 8 over lower cervical and upper dorsal region
Surface electrode about 3 x 3 over each lung alternately
Set surge indicator on about 15 surges per minute
Current strength: toleration of patient
Time of treatment: 10 to 15 minutes
Frequency of treatment: daily or more often as required

This contracts the longitudinal muscles and expels air from the lungs.

ATHLETE'S FOOT, Trichophyton Infection:

Technique: Fill up pyrex container with 2% Copper Sulphate solution, immerse affected area in solution, drop tip of cord of the Positive Pole in the solution. Negative Pole electrode 4 x 8 on calf of leg or two 3 x 3 electrodes by means of jumper cord
Current strength: 2 to 2½ Mills per square inch active electrode governed by toleration of patient's skin
Time of treatment: 15 to 30 minutes
Frequency of treatment: 3 times weekly if needed; one treatment may clear condition.

It is advisable that patient use clean hosiery after treatment. Dust between toes after treatment with Thymol Iodide Powder. Apply powder in shoes also. Shoes may also be exposed to ultra violet by inserting Orificial Burner for several minutes.

ATROPHY, Muscular

If the nerve is functioning:

Technique: Surging or Pulsating Galvanic Current
Surface electrode (P) on spine over nerve supply
Small diagnostic electrode No. 30 (N) on motor point of atrophied muscle
Set surge indicator on about 30 surges per minute
Current strength: sufficient to induce slight muscular reaction
Time of treatment: 10 minutes
Frequency of treatment: 3 times weekly

If reaction of degeneration is apparent:

Technique: Non-surging Pulsating Galvanic Current
Surface electrode about 4 x 8 on back (P)
Small diagnostic electrode with interrupter handle No. 15 (N) with No. 30 tip
Current strength: 5 Mils
A moderate current tolerance is used for motor points of the muscle
Time of current flowing: 3 or 4 seconds, followed by equal periods of rest over each motor point
Frequency of treatment: daily at first, then 3 times weekly

Care should be exercised to not over-stimulate the nerves or tetanize the muscles.

BACKACHE:

Caused by fatigue or strain:

Can be relieved by the application of radiant heat, followed by:

Technique: Non-surging Pulsating Galvanic Current
Surface electrode 4 x 8 (N) on abdomen
Surface electrode 3 x 3 (P) over painful area
Current strength: 10 or 15 Mils
Time of treatment: 15 minutes
Frequency of treatment: as required

BOILS:

In cases where boils reappear when others have subsided, as, for example, on the back of the neck, it is a good plan to introduce salicylic acid ions by means of the NEGATIVE GALVANIC current, electrode No. 10—covered with wet chamois, or cotton (soaked with salicylic acid, 2% solution), after painting the affected area with tincture of iodine. The treatment will take 5-10 milliamperes for 6 minutes twice weekly.

BRACIAL NEURITIS:

Acute:

Brachial Neuritis is best treated by the Galvanic Current. In the acute stage, place the electrode on the back and on the anterior shoulder, with negative back, positive front. In sub-acute or chronic cases, use the galvanic current with positive back, negative front, for ten minutes. If pain extends down the arm, the seance may be divided between shoulder and forearm, using the following technique:

Technique: Non-surging Galvanic Current
4 x 4 Electrode (N) wrapped around wrist
4 x 8 Electrode (P) thoroughly saturated with hot water and applied over clavicle
Current strength: 5 to 8 Mills.—no more
Time of treatment: 15 minutes
Frequency of treatment: 3 times weekly, daily if severe

Chronic:

Acute technique followed by Surging Sine Wave Current:

Technique: Electrodes placed as in acute
Depending upon the case in hand, set surge indicator somewhere between 8 and 25
Current strength: sufficient to contract muscles without too much pain
Frequency of treatment: 3 times weekly

The above technique may at first aggravate pain, which will subside after muscles have worked.

In acute inflammatory neuritis, *the Sine Wave Current should not be used*. (See Neuritis, Acute Inflammatory.)

BRONCHIECTASIS:

Short wave through region of dilated Bronchus followed by:

Technique: Surging Sine Wave Current
Surface electrode about 4 x 8 over chest approximately the location of dilated bronchus
Small surface electrode about 3 x 3 over fourth and fifth cervical vertebrae
Set surge indicator on about 15 surges per minute
Current strength: patient's tolerance
Time of treatment: 10 minutes
Frequency of treatment: 3 times weekly

BRONCHITIS:

May be relieved by the following technique:

Technique: Surging Sine Wave Current
Surface electrode about 4 x 8 on back
Surface electrode about 3 x 3 below clavicle toward medial line
Set surge indicator on about 15 surges per minute
Current strength: toleration of patient
Time of treatment: 10 to 15 minutes
Frequency of treatment: 3 times weekly, daily in the beginning if possible

BRUISES:

NEGATIVE GALVANISM using disc electrode No. 11, well moistened, the positive 3 x 3 well moistened pad being as nearly opposite as possible. Current strength 2-3 milliamperes for 6 minutes.

CARBUNCLES:

POSITIVE GALVANISM by the introduction of a zinc needle, No. 17, allowing a current up to 20 milliamperes for 10 minutes. The negative pole is a well moistened 3 x 3 pad as nearly opposite as possible.

CATARACTS, Incipient:

Some oculists report good results in early stages of cataract:

Technique: Non-surging Galvanic Current
No. 12 felt disc with No. 16 handle, saturated with warm water over closed eye-lids (N)
4 x 8 Surface electrode (P) on back
Current strength: ½ to 4 Mils., depending on toleration
Time of treatment: 10 minutes
Frequency of treatment: 3 times weekly

CEREBRAL CONGESTIONS, Headache:

Cerebral Congestion which often accompanies sleeplessness, hysteria, high blood pressure, or reflex, may come from the liver, intestinal disturbances and other causes.

Technique: Non-surgical Galvanic Current
Surface electrode about 3 x 3 at occiput (P)
Surface electrode about 3 x 3 over Solar Plexus
Current strength: not over 3 Mils.
Time of treatment: 5 to 10 minutes
Frequency of treatment: daily or often as required

If the whole head needs treatment, as is advised in Migraine, or super-orbital pain, moisten the scalp thoroughly and interpose a flat sponge, absorbent cotton, chamois, or some other flexible material, covered with block tin for contact, that would act as a good conductor and conform to the head better than the flat electrode.

CERVICAL LACERATION:

Take a No. 21 applicator and wind the tip with cotton, saturate the cotton with THIOSINAMIN solution,* place the electrode on the area of laceration. The negative pole is the usual 4 x 8 wet pad placed on the abdomen. Connect the No. 21 electrode with the positive pole and use a current strength of 5-10 milliamperes for 8 minutes. Repeat the treatment three times weekly.

CERVICITIS:

Many of these cases respond nicely through the use of vaginal diathermy alone, but the more severe cases require the employment of GALVANISM, and if only one method were available, the galvanic would be preferable. The treatment of both cervicitis and endocervicitis is the use of the POSITIVE pole with a copper electrode No. 1, in order to drive into the mucous membrane, the oxychloride of copper, for the purpose of getting at the cause of the trouble. The patient is placed on her back with the feet in the stirrups, and in a comfortable position, and the ordinary metal speculum employed. The negative poles is a 4 x 8 pad placed on the abdomen, after having been thoroughly soaked in hot saline solution. It is held in place with a sandbag. The positive copper electrode is now introduced into the cervical canal and the current slowly turned on to 5, 8, or 10 milliamperes, according to the toleration of the patient. The treatment is given for 15 minutes. The current is then reduced to zero and turned off, but when you attempt to remove the electrode, you will find that it is held fast. Instead of forcibly removing the electrode, reverse the polarity, making this electrode temporarily a negative one, and turn on the current to 2 M.A. for 30 to 60 seconds, then the dilating action of the negative pole will release the electrode. After a few treatments, then drying effect of the current will reduce the discharge to a small amount. When it gets to be comparatively insignificant in quantity, it is then advisable to give a few treatments, using the same electrode connected to the NEGATIVE pole, to get the effect of neutralizing the acid reaction by the alkaline effect from the negative current. This also liquifies the slight amount of remaining discharge, and the case is essentially cured. Use electrode No. 1. If smallest sound is too large, use negative galvanic first to dilate.

CERVIX, Stenosis of:

Technique: Non-surging Galvanic Current
Use electrode set No. 1, the smallest is to be used first
4 x 8 Surface electrode (P) to lower abdomen
Current strength: 3 to 5 Mils.
Time of treatment: 5 to 10 minutes
Frequency of treatment: every 5 to 10 days, using slightly larger dilator each treatment.

Never force the dilation. Negative pole will soften the tissue and permit dilator to enter without pressure. Most gratifying results can be accomplished with this method of treatment.

CHILBLAINS:

Technique: Diathermy or short wave followed by:
Non-surging Galvanic Current
3 x 3 electrode (N) above knee
3 x 3 electrode in contact with affected area (P), or submerge foot in glass tray of warm water with metal contact (P)
Current strength: 10 to 15 Mils.
Time of treatment: 10 minutes
Frequency of treatment: daily or 3 times weekly

CIRRHOSIS, of the Liver:

One-half hour with short wave, followed by:

Technique: Surging Sine Wave Current
Surface electrode about 3 x 3 over liver
Surface electrode about 4 x 8 on the back
Set surge indicator on about 30 surges per minute

---

*Thiosinamin	20 grains
Glycerin	2 drams
Water	6 drams
Sod. Chloride	5 grains

Current strength: sufficient to cause slight muscle contraction
Time of treatment: 15 to 20 minutes
Frequency of treatment: 3 times weekly

COLITIS:

Technique: Non-surging Galvanic Current
Surface electrode about 4 x 8 (N) over descending colon
Carbon ball electrode, covered with cotton, saturated with 1 part Lugal's Solution to ¾ part water, in rectum
Current strength: to toleration
Time of treatment: 15 to 20 minutes
Frequency of treatment: daily until relieved, then 3 times weekly

It is helpful to precede this treatment by short wave. Keep the bowels free with warm enemas. 110 degrees F. is suggested.

CONSTIPATION:

(See Intestinal Stasis and Ptosis)

DEAFNESS, Chronic

Technique: Non-surging Galvanic Current, followed by Surging Sine Wave Current
Cotton saturated with saline solution, placed in one or both ears, contact made to cotton with No. 25 metal electrode (N). No metal must come in contact with tissue
Use Non-surging Galvanic Current
3 x 3 Surface electrode on neck (P)
Current strength: 1 to 2 Mils.
Time of treatment: with Non-surging Galvanic Current, 15 minutes
Followed immediately by mild Surging Sine Current to same electrode position for same length of time

This technique is recommended highly as one of the best which has been advanced for treatment of deafness.

DYSMENORRHEA:

Unmarried Women:

In Dysmenorrhea, the success of the treatment will depend on the accuracy of diagnosis and the cause which may be either the ovarian or uterine misplacement or stenosis of the cervix. Stenosis of the cervix, especially in young and unmarried women is the most common cause. (See technique for Cervix, Stenosis of). By carefully following this procedure the use of the Galvanic Current will produce permanent dilation of the cervix. The results obtained by the use of the Galvanic Current are in marked contrast to those obtained by the more common method of forcible dilation under anaesthetics, the results of which are only temporary.

For other causes the following technique is suggested:

Technique: Non-surging Galvanic Current
4 x 8 Surface electrode (P) on abdomen
4 x 8 Surface electrode (N) on back, or, No. 8 Rectal electrode, covered with cotton, in place
Current strength: 10 to 12 Mils.
Time of treatment: 10 minutes
Frequency of treatment: apply treatments two days in succession preceding menstruation, and three times weekly following menstruation

Married Women:

Technique: Non-surging Galvanic Current
No. 14 Vaginal nickel electrode (N) covered with cotton, in place
4 x 8 Surface electrode (P) on abdomen
Current strength: 10 to 15 Mils.
Time of treatment: 15 minutes

If accompanied by stenosis of cervix, treat the cervix using technique suggested under Cervix, Stenosis of.

ELECTRO-DIAGNOSIS—Stimulation of Motor Points—Muscle Testing:

The principal aim of this method is to localize the current—Non-surging Sine Wave of required strength upon parts of the body marked for investigation, avoiding as much as possible unnecessary excitation of the neighboring structures.

The ACTIVE Electrode (No. 30 covered with moist chamois) is fitted to handle, No. 15, to enable the operator to switch the current on and off at any moment he wishes. Place one of the 3 x 3 small pad electrodes somewhere on the member as the INDIFFERENT electrode to complete the circuit. Both electrodes must be well moistened.

Each muscle has its own motor point. It is the surface marking of the point of entry of the motor nerve into the muscle. By moving the active electrode over the skin of different regions of the body, all muscles of the body, except those which are too deeply situated, can be made to contract.

To secure accuracy in the interpretation of his results the operator will do well to test healthy parts, especially if there is only one side of the body diseased, so that he may obtain a standard of comparison.

ENDOMETRITIS, Acute and Chronic:

When accompanied by pain or hemorrhage, the usual method of treatment has included dilation of the cervix and the use of the curette to remove the granulations and vegetations. A much more satisfactory method of treatment is presented in the use of Galvanism, the electrolytic action of the current destroying the granulations and vegetations. The antiseptic and tonic properties of the positive pole aid materially in accomplishing healthy reproduction.

Technique: Non-surging Galvanic Current
No. 1 Copper intrauterine electrode, placed in position into the uterus and supported so that it does not come in contact with, and is well insulated from, the vaginal walls (P)
4 x 8 Surface electrode (N), well moistened, placed on the lower abdomen
Current strength: not to exceed 10 Mils.
Time of treatment: 15 to 20 minutes
Frequency of treatment: once a week

ENURESIS:

The cases of incontinence of urine for which electrical treatment may be given, with prospect of success, are those due to weakness of the sphincter, and those in which the incontinence is really an unconscious act of micturition during sleep. Incontinence resulting from weakness of the sphincter occurs in female patients, and electrical treatment is usually successful. The Surging Sinusoidal current is used. The Urethral electrode is placed in position and the indifferent electrode placed over the 11th Dorsal to the 3rd Lumbar area. The current strength is increased until there is a slight contraction as shown by the movement of the urethral electrode. Treat daily for 10 minutes, and less frequently as improvement proceeds.

For cases of NOCTURNAL micturition during sleep the same treatment may be given when the patient is a female. In male patients and female children a small pad is placed on the 11th and 12th Dorsals and the ENURESIS electrode placed on the perineum and while the current is flowing, the perineum electrode is moved by stroking over the perineum area. Use electrode No. 3.

EROSION, of the Cervix Uteri:

Treat first for Endometritis, follow by one of the three suggestions below:

Technique: Non-surging Galvanic Current
(1) No. 6 Copper electrode placed in position in contact with the surface of the cervix (P)
4 x 8 Surface electrode on abdomen (N)
Current strength: 5 to 15 Mils.
Time of treatment: 10 minutes
Frequency of treatment: every fourth day; or
(2) If no No. 6 electrode is at hand, use No. 5 copper-ball electrode, covered with cotton, saturated with 2% solution of zinc sulphate (P)
Surface electrode on abdomen (N)
Current strength: 10 to 15 Mils.
Frequency of treatment: same as above; or
(3) If erosions bleed easily, always use the No. 6 copper metal electrode to the cervix (P)
Technique as above

ESOPHAGUS, Structure of (See Urethral Strictures):

EYELIDS, Granulated:

Technique: Non-surging Galvanic Current
A small tip copper electrode (special) (P)
4 x 8 Surface electrode on chest or back (N)
Invert the eyelid, holding the positive electrode as one would hold a pencil. Gently rub it over the granulated membrane. Have assistant gradually turn on the current until 1 Mil. is reached.
Time of treatment: until granules are coated with greenish gray
Frequency of treatment: once each 4 or 5 days

EYESTRAIN:

Technique: Non-surging Galvanic Current
Moist gauze pad covered with No. 12 felt disc with No. 16 handle placed over the eyes (N)
4 x 8 Surface electrode on the back (P)
Current strength: 2 to 3 Mils.
Time of treatment: 5 minutes
Frequency of treatment: once each week

FACIAL HEMIATROPHY:

Galvanic wave over the muscles involved, the negative pole connected to a moistened 4 x 8 pad on the cervical region to corresponding segments of nerve or muscle involved; the polarity being used according to sensory or motor paralysis. Use electrode No. 12 with handle No. 16, connected to the positive pole.

FACIAL NEURALGIA:

In all cases X-rays should be taken as there may be impacted molars or a minute remnant of a root after an extraction although extraction may have been made years past. The treatment consists of GALVANISM. Place over the area a pad, No. 12, and No. 16 handle, soaked in 1% solution of quinine bisulphate. Connect to the positive pole. The negative 3 x 3 well moistened pad is placed over the neck. Gradually turn on 3 to 8 milliamperes for ten to fifteen minutes. After the treatment, dust with talcum powder to prevent skin irritation. Another method is to take an applicator No. 18 covered with cotton soaked with Tincture of Aconite and place inside the mouth, if possible over the painful area, using a current of 3 to 5 M.A. for 3 minutes.

FALLEN ARCHES:

Fill two enameled trays with enough water to cover the top of the toes and immerse a 4 x 8 pad electrode in each tray. Place a foot on each pad, connect the pads to the Surging Sinusoidal, and turn on the current gradually until decided contractions are produced. Continue for 10 to 15 minutes and repeat daily. Frequence of the waves should be twenty per minute.

FIBROIDS:

In this method of treatment it must be remembered that the class of tumors to be treated are disticntly benign; and while they may take on many forms of degeneracy, colloid, calcareous, or suppurative, they never take or assume malignant degeneration. This, of course, does not imply that a cancerous condition may not be coexistent with a fibroid. The principal characteristics of all benign growths is that when nourishment is interfered with, they retrograde, and one of the strongest evidences of the benign character of uterine fibroma is the retrograde action that they take on at the time of the menopause. To those who understand the polar action of the galvanic current, it becomes apparent that no disintegration follows the use of the positive pole. On the other hand, it hardens tissue by coagulating the albuminoids of the blood, constricts tthe blood vessels by its action on the vasomotor nerves, thus lessening the blood supply to the growth, and by its sedative action allays the pain, and in most cases, brings about entire obliteration of the tumor.

Technique: Non-surging Galvanic Current
No. 9 Perforated copper ball electrode which has tube for introduction of 1:1000 Adrenal Chloride solution (P). Cotton is placed in the ball and replaced on the staff, and saturated with the adrenal solution. Electrode is introduced, guided by operator's finger up toward the tumor.
4 x 8 Surface electrode on lower abdomen, well moistened (N)
Current strength: gradual increase to 20 Mils. May be increased to 30 Mils. in future treatment after reaction has been noticed
Time of treatment: 10 minutes at full current
Frequency of treatment: 2 times weekly

FIBROMA:

Technique: Non-surging Galvanic Current
Lay thoroughly saturated 4 x 8 surface electrode on table beside patient or in the patient's lap, so that hand may be placed in contact with (P) electrode
Negative pole is attached to the smallest size half-curved surgical needle, mounted in an insulated needle holder No. 17
Point is inserted at one side of the base of the fibroma transfixing it just above the skin surface and parallel with the latter
Current strength: 1 or 2 Mils., being increased to 3 or 4 Mils., as treatment progresses, governed somewhat by sensation. The larger the mole, the less sensitive
A pearly distension of the mole will appear, indicating imprisoned hydrogen bubbles. Patient's hands are then raised from the pad and the operator inserts the needle in another place, parallel to the first. This procedure is repeated until the whole mole is soft and swollen and shows a sharp line of demarkation between the soft tissue and healthy skin. The crust is washed with alcohol and allowed to dry, the patient permitting the scab to drop off. If scab is removed before it is ready to drop off, a scar will result.

FISTULA:

POSITIVE GALVANISM by means of the No. 22 fistula electrode which is a copper wire with a bulbous end connected to the positive pole and introduced as far as possible in the fistulous tract. The negative is a well moistened 4 x 8 pad placed as nearly opposite as possible. The electrode should be slowly rotated to prevent sticking. Use a current of 3 to 5 M.A. for 10 minutes. Treat every third or fourth day if necessary.

FLAT FOOT:

Technique: Non-surging Pulsating Galvanic Current
Surface electrode about 3 x 3 (N) at inner side of knee over tibialis anterior
Surface electrode at inner curve of arch about 3 x 3 (P)
Current strength: 8 Mils.
Time of treatment: 10 minutes
Frequency of treatment: 3 times weekly
Followed by: Surging Sine Wave Current with electrodes in position
Set surge indicator on about 40 surges per minute
Current strength: sufficient to produce tolerable contractions
Time of treatment: 5 minutes at first, but increasing to 10 gradually
Frequency of treatment: 3 times weekly

FUNGUS INFECTION:

Technique: Non-surging Galvanic Current
Saturate gauze with 2% Copper Sulphate solution applied against affected area. Positive pole connected by means of block tin over saturated gauze. Size is governed by area under treatment. Use pad electrode Negative Pole opposite side or near by; size three or four times larger than active (P) electrode
Current strength: 2 to 2½ Mills per square inch active electrode. Governed by toleration of patient's skin
Time of treatment: 15 to 30 minutes
Frequency of treatment: 3 times weekly if needed; one treatment may clear condition
NOTE: 1% Silver Nitrate solution is substituted where area is ulcerated. In cases where small pearly bubbles are visible under the skin, these should be pricked for drainage to allow Copper solution to reach the deeper structure. (Do not force drainage.)

GALL BLADDER, Drainage of:

Infra Red radiation over gall bladder area, followed by:
Technique: Surging Sine Wave Current
Surface electrode about 4 x 8 over the sacrum
Surface electrode about 3 x 3 over the 5th and 6th dorsal vertebrae on the right side; patient lying on back

Set for 20 surges per minute
Strength of current: until distinct contractions can be felt
Time of treatment: 10 to 15 minutes
Frequency of treatment: 3 times weekly

GALL BLADDER, Stimulation:

Technique: Surging Sine Wave Current
3 x 3 Small surface electrode under each shoulder blade
Current strength: to tolerance
Set for 20 surges per minute
Time of treatment: approximately 10 minutes first treatment, increasing one minute daily
Frequency of treatment: daily
Patient should be given large glass of warm water before starting treatment, and should practice deep breathing during treatment

GOITRE, Adolescent

The treatment of adolescent goitre differs from that of cystic goitre and usually causes disappearance.

Technique: Non-surging Galvanic Current
Surface electrode (P) on back btween shoulders
3 x 3 Surface electrode (N) well saturated with warm 2% Potassium Iodide over affected area
Current strength: 5 to 8 Mils.
Time of treatment: 15 minutes
Frequency of treatment: 3 times weekly

GOITER COLLOID:

Negative Potassium iodide ionization. Use electrode No. 11, covered with chamois or gauze saturated with 2% Potassium Iodic solution.

Reprint from *The Laryngoscope*, St. Louis, September, 1934.

A YEAR'S WORK WITH IONIZATION IN THE TREATMENT OF HAY-FEVER.*

Dr. Arthur M. Alden, St. Louis

My experience with ionization in the treatment of hay-fever began the first week in September, 1933, when Dr. Warwick was kind enough to come to St. Louis and demonstrate this procedure to me. The results in the demonstration cases were so prompt and satisfactory that I decided to investigate this treatment more thoroughly on a group of my own cases.

During the 1933 season I ionized 19 cases of typical autumnal hay-fever. One of these patients was a child 10 years old, in her third season of the disease. The others were all adults between 22 and 58 years of age. Most of them were in the age period between 30 and 50 years. All of these cases were ionized during the period when the symptoms of the disease were definitely manifest, and four of the adults also had asthma at time of the ionization. Eleven of these patients had previously been treated by desensitization, but with unsatisfactory results. Five had received only local treatment, and three, including the child, had received no treatment of any sort.

The results of the ionization in this group was immediate and complete relief in each case of all allergic symptoms for the remainder of the season. The promptness with which the eye symptoms and the nasal itching abated following the treatment was indeed spectacular. In all of these cases the nose was entirely blocked with a membrane the day following the ionization. This membrane remained in place for three to four days, then began to loosen and was, as a rule, entirely gone by the end of the sixth day. Immediately following the expulstion of the membrane, the nasal mucosa was found to be reddened and quite sensitive, but this condition subsided very rapidly and by the end of the second week, all noses appeared to be normal. The only post-operative medication used was a solution of ephedrin in oil, which was given to be used as nasal drops by the patient after the membrane had been expelled.

---

*From the Department of Otolaryngology, Washington University Medical School, St. Louis.

The majority of this group of cases have been followed closely since last hay-fever season and in not one of them has there been any clinical evidence of damage to the function of the nose.

Naturally, we watched this group of patients with great interest when the hay-fever season started again this year. Two of them began at once with very typical symptoms, differing little from previous years. Both of these persons were promtly reionized and are entirely comfortable at the present time. Six others had slight symptoms at the beginning of the season, but their attack this year has been so mild that another ionization was not advised. Two others began their symptoms two weeks after the season had started in St. Louis, but each of these has had little discomfort that it has been easily controlled by local treatment. Nine of last year's cases have been entirely without symptoms up to the present time.

Prior to Aug. 15 of this year, 41 cases, each with a definite history of autumnal hay-fever, were ionized with the hope that they would be protected when the pollen season began. Two of these were children 6 years old. Two were 72 and 77 years old, respectively, four were between 60 and 70 years, and the remainder were principally in the age group between 30 and 50 years.

The time elapsing between the ionization of the patients in this group and Aug. 15 is as follows:

Eight months, one; six months, one; four months, two; three months, five; two months, nine, and the remaining 23 were done in the period between July 15 and Aug. 15. Of this group, 15 patients have shown definite symptoms, varying from a typical attack with asthma down to slight sneezing and mild conjunctival irritation. Six have not reported and the remainder are entirely comfortable. Of the failures, six were in the group done in the month prior to Aug. 15, eight done two months prior, and one in the three months period. Curiously enough, the four patients who were ionized eight months, six months and four months, respectively, before Aug. 15, were all completely protected.

Nine of the failures have been reionized with complete relief in all but two. These two cases in spite of reionization and local treatment are still having definite symptoms. Two of the remaining six who were having trouble refused the reionization and the other four were having so little discomfort that retreatment was not advised.

In this, as in all cases of experimental therapy, the failures are more interesting and instructive than are the successes. It would appear that the age of the patient and duration of the symptoms prior to the ionization have little to do with the success or failure of the treatment. One of the most outstanding successes was in a patient 66 years old, who had had hay-fever, complicated with a very severe allergic conjunctivitis and who was ionized twice eight months prior to the beginning of the hay-fever season. Another was a patient 77 years of age, who had had hay-fever for more than half a century and who was ionized four months before Aug. 15. This patient has also been entirely relieved of all allergic symptoms. It is perhaps noteworthy that of nine patients done between the period of June 15 and July 15, eight of them had a return of symptoms; whereas, of nine patients done in the period from three to eight months prior to the beginning of the season, only one showed any symptoms this year. Of the 23 ionizations that were done before July 15 and Aug. 15, six, or about 25 per cent, had definitely hay-fever after the season began. Certainly, no definite conclusions can be drawn from the above statistics.

At the present time an investigation of a group of clinic patients with hay-fever is being carried out at Barnes Hospital. This work is under the direction of Dr. Harry Alexander and myself. These patients are being studied from an immunological and cytological standpoint, both before and after ionization, and a detailed report of this work will appear in a later paper.

A theoretical criticism of this treatment based upon the possibility of permanent damage to nasal mucous membrane as the result of ionization has been made by many individuals. I now have sections of middle turbinates removed from a group of patients, who have been ionized from one to seven months previous to the biopsy and without exception these specimens show intact and normal mucosa. Microphotographic reproduction of these sections with descriptions will appear in a later publication.

In all of this work the standard apparatus and technique, as originally devised by Dr. Warwick, has been used.

CONCLUSIONS

1. Nasal ionization following the technique elaborated by Warwick when given after the hay-fever symptoms have started apparently stops the disease in the majority of patients for the remainder of the reason.
2. About 50 per cent of these patients are free of symptoms during the second season.
3. When the treatment is given prior to the beginning of the pollen season, about half of the patients appear to be completely protected.
4. Clinical observation and microscopical examination of nasal tissue has thus far shown no evidence of permanent nasal damage following ionization.

HEMORRHAGE:

POSITIVE GALVANISM. Electrode according to area, copper.

HEMORRHOIDS:

Place the patient in Sim's position, wet thoroughly a 4 x 8 pad and place under the gluteous muscle connecting with the negative pole. The POSITIVE pole is a special No. 7 HEMORRHOIDAL ELECTRODE. This electrode is covered with a fish skin and moistened, pushing up with the electrode any fringe or prolapsed membrane. The current is turned on to 10 milliampere for 10 minutes. The milliamperes may be increased to 20 although there is a great difference in patients due to the nerve center at this region. In most cases the treatment may be repeated every second or third day, and usually takes from 4 to 6 treatments.

OBLITERATION OF INTERNAL HEMORRHOIDS:

Method of Dr. W. E. KEESEY, M.D., Chicago—Reprint *Archives*, Sept., 1934.

1. Give cleansing enema
2. No anasthesia, as pain is guide
3. Patient lies on left side on well moistened pad electrode
4. Needle connected with NEGATIVE pole
5. Insert needle into uppermost hemorrhoid, where bright red tissue is observed. Don't touch opposite wall of hemorrhoid
6. Hold needle-holder nearly parallel to rectal wall
7. Turn current on slowly to 10-15 M.A. Patient should have no pain. If he complains, technique is improper. Needle must be re-inserted
8. Discoloration to dark red and sometimes nearly black is sign of successful treatment. Time approx. 12 minutes. Inject small quantity 1% nupercaine ointment into rectum

HERPES ZOSTER:

Technique: Ultra-violet radiation
For Neuritis following, use,
Technique: Non-surging Galvanic Current
No. 12 felt disc electrode over the affected area saturated in 1% sodium salicylate (N) and connected with No. 16 handle
3 x 3 Surface electrode placed over emergence of affected nerve (P)
Current strength: 5 Mils.
Time of treatment: 15 minutes
Frequency of treatment: daily

HICCOUGH:

Interrupted Rapid Sinusoidal with 3 x 3 moistened pad to the 2nd and 3rd cervicals, the patient extending the arms while current is applied. The indifferent electrode is the usual well moistened pad (4 x 8).

HYPEROVARIANISM:

Positive galvanism to the uterus. Use electrode No. 1, with 4 x 8 moistened pad on abdomen. Use 5, 8 or 10 M.A. for 10 minutes.

HYPERTENSION:

"High Blood Pressure," by W. F. BROKAW, M.D., Cleveland, Ohio.

Extract of technique from *Ohio State Medical Journal,* June, 1935.

Place one well moistened 3 x 3 electrode on the calf of each leg just below the knee. Use current just strong enough to make fairly sharp contraction of the muscles, about 10 to 12 surges to the minute. Treatment time, approximately 5 minutes. Use Surging Sine Wave for this treatment.

HYPERTRICHOSIS, Superfluous Hair:

Technique: Non-surging Galvanic Current
4 x 8 Surface electrode under patient's hand (P)
Attach Hayes' bulbous pointed steel needle in No. 17 needle holder (N)
Current strength: ¼ to 1 Mil. on each follicle
Time of treatment: about 2 to 5 seconds

The current is adjusted before treatment is begun. Insert the needle to base of follicle and then have patient put his hand on surface electrode lying on a table, closing circuit in this manner. This procedure gives little sensation to the patient. Hold epilation forceps in the other hand ready to remove the hair. Generally a bit of froth will appear at the base of a follicle. If hair does not epilate at a touch from the forceps, repeat the treatment at once. If it still does not come out, pull it out forcibly, otherwise it will develop an irritating reaction. After removal of hairs, it is well to apply the positive pole connected to a copper electrode covered with cotton soaked in 1% solution of copper sulphate over the epilated area. This procedure neutralizes the alkaline caustic liberated under the above negative treatment. The negative pole, of course, is connected to the pad under the hand in this secondary treatment.

INFANTILE PARALYSIS:

(See Paralysis Infantile)

INTESTINAL STASIS AND PTOSIS

In nearly all cases of colonic distortion when the transverse colon alone is found sagging, the cause may be traced to ptosis of the stomach. If the stomach is affected and there is no evidence that the digestive tract below fails to function normally, treatment should be confined to the stomach. For technique, see Stomach, Dilation and Ptosis of.

IRITIS, Chronic:

Technique: Non-surging Galvanic Current
3 x 3 Surface electrode (P) on back of neck
Gauze pad well moistened placed over closed eyelid and covered with No. 12 felt disc connected to No. 16 handle (N)
Current strength: 2 to 3 Mils.
Time of treatment: 10 minutes
Frequency of treatment every day for three days, then alternate days.

This treatment may be preceded to advantage with radiant light for 20 minutes over closed eyelids.

JOINTS, Traumatic:

The following treatment is exceedingly valuable in treating stiff joints as elbows, ankle, knee, or shoulder, following fracture or inactivity due to the application of splint or sling, sprains or bruises.

Elbow:

Technique: (1) If elbow is bent:
Surging Sine Wave Current
Surface electrode about 4 x 8 to back over upper dorsal region
3 x 3 Surface electrode over back of elbow on insertion of triceps
Set surge indicator on about 40 surges per minute
Current strength: enough to forcibly contract extensors and rhythmically straighten arm
Treat daily as soon after splint is off as possible, beginning cautiously so as not to rebreak the recent injury
Time of treatment: five minutes, gradually increasing to 15 minutes as treatments progress.
Frequency of treatment: 3 times weekly
(2) If elbow is straight:
4 x 8 Surface electrode on the back
3 x 3 Surface electrode on insertion of the biceps
Balance of technique as above

Ankle:

Technique: Surging Sine Wave Current
Surface electrode about 3 x 3 under the foot
Surface electrode about 3 x 3 on back of leg
Set surge indicator on about 40 surges per minute
Current strength: sufficient to contract and extend the foot
Time of treatment: 5 minutes in this position and then change electrode on back of leg to the insertion of tibialis anterior
Use same technique as for elbow

Knee:

Technique: Surging Sine Wave Current
3 x 3 Surface electrode on each side of knee
Set surge indicator on about 30 surges per minute
Current strength: sufficient to deeply massage the joint
Time of treatment: 3 minutes, then move pads placing one over and one under the knee. Treat again for 3 minutes and then move pads to one above and one below the knee anteriorly. Treat again for 3 minutes
Frequency of treatment: 3 times weekly

Shoulder:

Technique: Surging Sine Wave Current
4 x 8 Surface electrode between the shoulders on the back
3 x 3 Surface electrode on upper arm
Set surge indicator on about 30 surges per minute
Current strength: sufficient to move shoulder joint
Time of treatment: 10 minutes
Frequency of treatment: 3 times weekly

KIDNEY INTERSTITIAL NEPHRITIS, CHRONIC:
(Contracted Kidney; Nephritides; Inflammatory Kidney):

Regular treatment for anemia; colonic irrigations; sine-wave currents by placing the 3 x 3 pad on each leg below the knee for 5 to 10 minutes. Treatment daily.

KRAUROSIS VULVAE:

2% copper sulphate ionization through fish skin enclosing cotton moistened with the solution which surrounds the copper ball of No. 5 electrode. Ultra Violet to a minus first degree erythema to the vulva. Use electrode No. 5, 10 M.A. for 10 min.

LABYRINTHITIS CIRCUMSCRIBED:

Zinc ionization through the No. 25 ear electrode, Pos. Pole. The usual 4 x 8 moist pad at back, Neg. Pole. 1 to 3 M.A. for 4 to 6 min.

LABYRINTHITIS DIFFUSE SEROUS:

Zinc ionization through the No. 25 ear electrode, Pos. Pole. Note spinal centers, check and correct blood pressure. The usual 4 x 8 moist pad at back, Neg. Pole. 1 to 3 M.A. for 4 to 6 min.

LABYRINTHITIS PURULENT:

Zinc ionization through the No. 25 ear electrode, Pos. Pole. The usual 4 x 8 moist pad at back, Neg. Pole. 1 to 3 M.A. for 4 to 6 min.

LIVER (See Cirrhosis of):
LEUKORRHEA (See Endometritis):
LUMBAGO, Acute and Chronic:

Acute:

Technique: Non-surging Galvanic Current
4 x 8 Surface electrode on back over lumbar region (P)
4 x 8 Surface electrode on abdomen (N)
Current strength: 10 to 15 Mils.
Time of treatment: 10 minutes
Frequency of treatment: 2 or 3 times weekly, as required

Chronic:

Technique: Same as above, followed by
Non-surging Sine Wave Current to comfortable toleration, with electrodes in position for same period of time.

MASTITIS, Chronic:

Technique: Surging Sine Wave Current
4 x 8 Surface electrode on the back over sacrolumbar region
3 x 3 Surface electrode over the growth
Set surge indicator on about 55 surges per minute
Current strength: sufficient to cause a slight contraction
Time of treatment: 20 to 30 minutes
Frequency of treatment: daily for two to four weeks

If sensory symptoms are relieved along with diminution of growth, malignancy may safely be ruled out. If sensory symptoms disappear but growth remains the same, operation is indicated.

MENORRHAGIA:

Technique: (1) Non-surging Galvanic Current
4 x 8 Surface electrode over abdomen (N)
No. 1 Intrauterine copper electrode inserted in uterus (P)
Current strength: 5 to 8 Mils.
Time of treatment: 10 minutes first treatment, and increase one minute each treatment giving treatment once a week

Technique: (2) 4 x 8 Surface electrode on abdomen (N)
No. 5 copper ball electrode covered with cotton inserted into uterus (P)
Current strength: 10 to 15 Mils.
Time of treatment: 20 to 30 minutes
Frequency of treatment: once a week

Technique (3) 4 x 8 Surface electrode on abdomen (P)
4 x 8 Surface electrode on sacrum (N)
Current strength: 15 to 20 Mils.
Time of treatment: 30 minutes
Frequency of treatment: 3 times weekly

METRITIS:

These conditions require the application of the POSITIVE pole of the GALVANIC current. The treatment is simple. Take a No. 5 copper ball electrode, cover it with cotton, well moistened, and place at the cervix or well up in the posterior vault of the vagina attached to the POSITIVE pole, the negative being the usual abdominal 4 x 8 pad. Employ a current strength of from 10 to 20 M.A. for 10 minutes, and repeat the treatment as necessary.

NEURALGIA, Acute:

Technique: (1) Non-surging Galvanic Current
4 x 8 Surface electrode on back of abdomen (N)
3 x 3 Surface electrode over affected area (P)
Current strength: gradually increased to 5 Mils.
Time of treatment: 30 minutes
Frequency of treatment: three times weekly
(2) 4 x 8 Surface electrode on back or abdomen (N)
No. 12 felt pad covered with gauze soaked with 2% quinine bichloride over affected area (P)
Current strength: gradually increased from 5 to 8 Mils.
Time of treatment: 15 minutes
Frequency of treatment: repeat for one or two days as necessary

NEURALGIA SUPRA ORBITAL:

Nasal ionization with 1:1000 adrenalin. Use electrode No. 21 covered with cotton soaked in the solution connected to the positive pole. The negative is connected to the usual 4 x 8 moistened pad on the chest. 5 to 6 M.A. for 2 minutes.

NEURALGIA TRIGEMINAL:

Ionization of aconite. Use electrode No. 21 covered with cotton soaked in the aconite solution connected to the positive pole. The negative 4 x 8 moistened pad is placed on the chest. 5 to 8 M.A. for 10 to 15 min.

NEURITIS, Acute Inflammatory:

Technique: Non-surging Galvanic Current
3 x 3 surface electrodes above and below painful area
Current strength: 10 to 15 Mils.
Time of treatment 30 minutes
Frequency of treatment: 3 times weekly

Chronic:

Technique: Non-surging Pulsating Galvanic Current
4 x 8 surface electrode on back (P)
No. 12 felt disc to No. 16 handle electrode saturated with 2% sodium salicylate (N) to affected area. Connected to No. 16 handle
Current strength: in back of legs: 10 to 15 Mils.
Current strength: about head or face: not to exceed 5 Mils.
Time of treatment: 20 minutes
Frequency of treatment: 3 times weekly

NEURITIS, Brachial:

(See Brachial Neuritis)

NEURITIS, of Arm:

Technique: Non-surging Galvanic Current
3 x 3 surface electrode over nerve supply on spine (P)
3 x 3 surface electrode at wrist (N)
Current strength: 8 Mils.
Time of treatment: 10 minutes
Frequency of treatment: daily if necessary

OBESITY:

Technique: Surging Sine Wave Current
Apply one, two, or more 4 x 8 surface electrodes over front area and attach to one terminal, bifurcated
Apply same number of 4 x 8 surface electrodes directly opposite those in front of back area and attach to other terminal
Set surge indicator on about 15 to 40, depending on the rapidity of the reaction required
Current strength: to a comfortable toleration
Time of treatment: 10 to 20 minutes, beginning with short time and increasing each treatment until muscles are acustomed to exercise
Frequency of treatment: 3 times weekly

Patient should be prone, with sand bags over each electrode front or back, so that the contractile action of muscles may lift the sand bags of a weight to be determined by the strength of the patient. Treatment must not be carried to the point of fatigue.

OTITIS MEDIA:

Cleanse the ear with 2% zinc sulphate solution prior to treatment.

Technique: Non-surging Galvanic Current
Fill ear with warm non-isotonic solution of Zinc Sulphate (2%)
Insert No. 25 ear electrode containing cotton saturated with 2% Zinc Suphate solution. Avoid danger of contact of metal with aural tissue (P)
3 x 3 surface electrode on shoulder or arm of side affected (N). This avoids possible vertigo by lateral passage of current through the brain
Current strength: increase gradually to 2 to 5 Mils.
Time of treatment: 10 minutes
Frequency of treatment: as often as required

NON-ISOTONIC SOLUTION

Zinc Sulphate		Gr VLlss
Glycerin		Min. VCVI
Water	q.s.	Ad oz. Lllss

Sig: Dilute with equal quantity of warm water before using.

OVARIAN CYST:

Positive Galvanism. Use electrode No. 5

OVARIAN TUMOR:

Positive Galvanism. Use electrode No. 5

OZENA:

Wash out the nose with a nasal syringe. Nasal electrode No. 26, covered with cotton saturated with copper sulphate solution and connected to the positive pole allowing a current of 3 to 5 M.A. for 5 minutes. The negative pole is the usual wet pad placed on the opposite shoulder to the side of the nose being treated. Treat three times per week. Ultra violet (orificial) and sinus treatment by short wave also very good for this condition.

PARALYSIS:

In all forms of Paralysis, the treatment to be selected depends upon the degree of nerve injury present. The current must pass through the affected muscle or muscles lengthwise, never transversely. A general rule to follow in attaching electrodes is to place one over the spinal nerve supply controlling the muscles affected, and the other beyond or to the extremity of the disability.

For example, in treating paralysis of the arm, whatever may be the cause, place a 4 x 8 electrode on the back over the 6th to 8th dorsal vertebrae, with 3 x 3 electrode in the palm of the hand or on the wrist, using the positive pole on the spinal nerve exit in the acute or painful cases. In chronic cases, apply the negative pole to the spine.

In treating paralysis of the leg, the same general procedure is carried out. It is undesirable to cause stimulation of paralyzed muscle for a period of over ten minutes to prevent possible fatigue.

In treating the average paralyzed area, the Surging or Pulsating Galvanic Current is indicated, as this current causes increase in circulation and nutrition to the nerve and muscle fibres, at the same time causing a contraction and exercise of the muscles simultaneously. The surge selected should be the one which produces contractions timed to imitate the normal action of the muscles being treated.

Technique: Surging or Pulsating Galvanic Current
4 x 8 surface electrode over 6 to 8th dorsal vertebrae (N)
3 x 3 surface electrode in palm of hand or on the wrist (P)
Current strength: 5 to 15 Mils., depending on size of part and distance between the electrodes
Set surge indicator on about 15 surges per minute
Time of treatment: 10 minutes
Frequency of treatment: 3 times weekly

In paralysis of the leg, apply the 4 x 8 surface electrode to the lumbar region and the 3 x 3 electrode to the ankle. Set surge indicator on about 35. The rest of the treatment is the same as for the arm.

PARALYSIS, Infantile:

Following the acute state, the application of the Surging or Pulsating Galvanic Current will produce astonishing results in the average case.

Technique: Surging or Pulsating Galvanic Current
4 x 8 surface electrode at the spine (N)
3 x 3 surface electrode at the wrist or ankle (P)
Current strength: 5 to 6 Mils.
Time of treatment: 5 to 10 minutes
Frequency of treatment: daily

Various ways and means of applying the current to desired parts are used as follows:

(1) If lower limbs are affected, the foot may be immersed in warm baths in porcelain or glass containers, with piece of block tin bent over edge to make contact with water and connect with wire
(2) One 4 x 8 surface electrode well saturated may be placed on the back at the lumbar region. One 3 x 3 surface electrode Set surge indicator on about 40 for treating lower limbs
(3) If upper limbs are affected, two arm baths may be substituted and used as the two foot baths are used
(4) If arm and hand is affected, a 3 x 3 pad may be placed on the shoulder. Another 3 x 3 pad placed around the hand and the forearm with the arm supported longitudinally.

POLIOMYELITIS ANTERIOR, CHRONIC:

For the average office treatment the Plate-electrode Method is used. This is a method in which one 4 x 8 pad is placed at the spine and the other at the affected limb. If the lower limb is the seat of paralysis, a 4 x 8 pad electrode is applied to the back so as to cover the lower dorsal and upper lumbar vertebrae and the parts laterally adjacent. This electrode is soaked in hot saline and the patient lies on it. The other electrode 3 x 3 is applied to the sole of the foot and kept in position by a bandage. If muscles are paralyzed in both lower limbs, an 3 x 3 electrode is applied on each sole. If the muscles show reaction of normal type, the SURGIING SINUSOIDAL is used. If the muscles show the reaction of degeneration, the SLOW SINUSOIDAL is used. The two pads are connected to the two terminals, but if both limbs are treated at the same time, the two electrodes at the soles are joined together and connected to the same terminal. In cases where the upper extremities are paralyzed, the spinal pad is placed at the corresponding area.

In this form of treatment the muscles affected contract and relax in regular rhythm. It is important that the muscles are not placed in a position where they are stretched but must always be supported.

It is useless to commence treatment of infantile paralysis with the belief that a short course will effect all the improvement that it is possible to obtain. If the paralyzed muscles show reactions of the normal type, the recovery of voluntary power will be fairly rapid. If they show the reaction of degeneration, the return of function of the neurons which have escaped destruction will be slow, particularly in the later stages. Treatment should be from 20 to 30 minutes and given NOT LESS than twice weekly. The treatments should be accepted with the understanding of a period covering six months.

POLYCYTHEMIA:

Colon irrigation followed by sine wave below each Knee. Use 3 x 3 pads below knees and current to comfortable tolerance for 10 to 15 minutes.

PROSTATE HYPERTROPHY:

Symptoms:
- Blood in urine
  - Pain in penis
  - Urinary frequency at night
- Tenesmus
  - Urination painful or difficult
- Cystitis
  - Urinary retention or dribbling
- Cystoscopy
  - Mid-age

Treatment:

The term hypertrophy used in connection with the prostate is rather a misnomer. True hypertrophy is only an enlargement of the normal cells composing the gland, but in the case in question, we have not a true hypertrophy, but rather an accumulation of tissue due to an inflammatory process, which comes up between the glandular elements and by pressure reduces them in size. The more proper term would be ENLARGEMENT of the prostate. If the condition preceding prostatic hypertrophy were properly treated, much of the after trouble would be avoided and the object of this outline is more for the purpose of establishing a more rational treatment for the pathological conditions preceding than the hypertrophy itself. Chronic posterior urethritis, prostatorrhea, hyper-sensitiveness of the urethra and prostatic strictures are the most important lesions which eventually lead to so-called prostatic hypertrophy. To allay the inflammation requires the application of the POSITIVE pole of the galvanic current, but wherever a metal electrode attached to the positive pole is applied to mucous surface, it always sticks firmly, due to the dehydrating properties of the pole. As it would be inadvisable to make such an application to the prostatic urethra, thereby disarranging the delicate mucous membrane, some means must be adopted to overcome this difficulty. The electrode used is a CURVED RUBBER STAFF with about two inches of the closed end perforated. A zinc, copper or silver wire runs the length of the staff and connects with a terminal. Cotton is wound around the end of the wire for a distance of two inches and after being well soaked and replaced on the staff, the electrode is introduced into the prostatic urethra attached to the positive pole, the negative pole is a 4 x 8 pad well moistened and placed upon the abdomen and the current is turned on gradually until a flow of six milliameters is reached which is maintained for eight minutes. The electrode should be left in position and four minutes of SLOW SINUSOIDAL current mildly applied to flow the ionization.

The No. 24 Electrode is used for Copper Ionization.

The No. 23 Electrode is used for Zinc or Potassium Iodide Ionization.

The No. 29 Electrode is used for Silver Ionization.

PROSTATITIS:

In some cases response is more favorable in this technique if it is preceded by short wave application to prostate, particularly in inflammatory cases due to infection.

Technique: Surging Sine Wave Current
- No. 24 or 29 prostatic electrode, in place, cotton is wound around the end of the wire for a distance of 2 inches and wet with water
- 4 x 8 surface electrode under patient's hip, well moistened
- Patient lies in Sim's position with knees well up to head
- Current strength: to tolerance
- Set surge indicator on about 30 surges per minute
- Time of treatment: 10 minutes Frequency of treatment: daily

RECTAL FISSURE:

Copper ionization. Use electrode No. 22. 3 M.A. for 4 minutes. Only two or three treatments usually required.

RECTAL FISTULA

Copper ionization and Ultra Violet locally. Use electrode No. 22. 3 M.A. for 4 minutes. Only three to five treatments usually required.

RHEUMATISM: See Arthritis.

SCAR TISSUE:

Cleanse the area. Cover with dental rubber, cutting out a hole the shape and size of the scar. Cover this area over the rubber with cotton saturated with THIOSINAMIN solution. (Formula page in back of book.) Place over the cotton block tin to cover and connect with the POSITIVE pole of the Galvanic, the negative pole is a 4 x 8 wet pad placed as near opposite as possible. Apply a current of 4 milliampere which may be increased to 8 milliamps, according to the reaction. The second treatment should not be given until the skin overlapping the scar becomes dead, and can be readily peeled off, which usually takes three or four days.

SINUSITIS ETHMOIDAL:

1:1000 adrenalin chloride ionization. Use electrode No. 21. Same technique as sinusitis frontal.

SINUSITIS FRONTAL:

These cases usually suffer untold agony. There is one diagnostic sign, and that is—pressure on the floor of the sinus, just over the eyeball, produces considerable pain. The cause of pain is usually due to obstruction of the infundibulum or duct, draining the sinus which opens in the middle meatus of the nose. First, we must open this duct and institute drainage. To do this, cover No. 21 electrode with cotton soaked in a 1:1000 ADRENALIN solution, and insert it well up in the middle meatus. Connect to the POSITIVE pole of the GALVANIC, the negative being attached to a 4 x 8 well moistened pad on the chest, and give 3 milliamperes of current for 4 minutes. Then remove, and have the patient take a deep breath, close the other nostril and forcibly breathe through the affected side. The vasoconstrictor action of the positive pole and adrenalin usually opens the duct, the suction caused by rush of air usually produces a discharge of the sinus, followed by gratifying relief.

SINUSITIS MAXILLARY:

Zinc ionization. Use electrode No. 21, covered with cotton soaked in 2% zinc sulphate solution and inserted well up into the middle meatus. Connect to the positive pole, with the 4 x 8 moist pad on chest. Current 3 M.A. for 4 to 6 minutes.

SINUSITIS SPHENOID:

Copper ionization. Use electrode No. 21. Same technique as for maxillary sinusitis except use 2% copper sulphate solution on the cotton of the electrode.

STOMACH, Dilation and Ptosis of:

Technique: Surging Sine Wave Current
- 4 x 8 surface electrode on nerve supply on spine
- Surface electrode about 3 x 3 over stomach
- Set surge indicator on about 15 surges per minute
- Current strength: to comfortable contraction
- Time of treatment: 10 minutes Frequency of treatment: 3 times weekly

Any distortion due to ptosis, a result of muscular intertia, will result in angulation, kink, fold or twist which will retard elimination of residue, and constitutes a foci of infection and a possible seat for future adhesions, ulcer, or cancer where surgery, which usually comes too late in such cases, must be resorted to.

In the light of present medical knowledge, it is always advisable, and in many cases most essential, that a careful X-Ray study of the region involved be made before deciding on the action to be recommended for relief.

When function of voluntary muscles of the body becomes impaired, exercise proves to comprise the essential treatment necessary to restore tone strength and function thereto. The same is true of the gastrointestinal tract and the muscle structure of the colon itself. If the patient is not too old or tubercular, and has no specified disease whereby complete restoration of normal function may be rendered impossible, restoration of normal function can be, in most cases, restored.

TORTICOLLIS:

Apply the INFRA RED to the OVER-RELAXED side or use the short wave. Follow with the RAPID SINUSOIDAL using the special ROLLER electrode over the RELAXED side for 5 minutes, the indifferent 3 x 3 wet pad electrode, may be connected to the hand on the opposite side. This should be followed with a deep kneading massage, and ended with a stretching-vibration-rotation movement to the neck.

URETHRAL STRICTURES:

The technique in these cases is simple, as special nickel olives are used for the purpose. The caliber of the stricture is taken in the usual manner with a urethral sound or this can be done by first taking the small olive and inserting it; if it does not engage with the stricture, insert the next size and so on until one is found that does engage with the stricture.

Technique: Galvanic Current
Suitable size nickel olive connected to staff of electrode No. 3 (N)
4 x 8 surface electrode, well moistened, to back (P)
The Negative current will allow the olive to pass the stricture without forcing
Current strength: 3 Mils.
Time of treatment: 10 minutes
Frequency of treatment: once weekly or more if necessary, using next size olive

URETHRAL ULCERATION:

The technique is the same as the above with the exceptions that copper olives are used and the POSITIVE pole connected as the electrode No. 3. Allow 1 to 2 milliamperes, with a slight movement to prevent sticking. Should the electrode stick, however; the current is reduced to zero and the polarity reversed for a few seconds only. Use No. 3 electrode. Use 1-2 M.A. for 10 minutes.

UTERINE FIBROIDS:

Galvanic positive ionization of 1:1000 Adrenalin chloride. Use No. 9 electrode covered with chamois or gauze soaked in the adrenalin solution. 10 to 15 Mils., 15 minutes, 3 times weekly.

UTERINE SUBINVOLUTION:

Two methods are available. One is the use of the INTERRUPTED GALVANIC current with one 3 x 3 electrode over the 4th Lumbar center in the spine, and the *prolapsus* electrode, No. 4, covered with moist cotton on the cervix. Contraction will occur with each interruption of the current. Treat for 3 min.

A better method is the use of the INTERRUPTED RAPID SINUSOIDAL current, which may be used with one 4 x 8 pad over the 4th Lumbar and the No. 27 vaginal ELECTRODE in the vagina, or two 3 x 3 electrodes connected by the bifurcated cord at the 4th Lumbar one on each side of the spine. The vital point is that the 4th Lumbar, which is the uterine center, shall be covered by one electrode. Treat for 5 to 7 minutes 3 times per week.

The writer's method is to use the No. 4 PROLAPSUS ELECTRODE covered with moist cotton placed at the cervix, with a 4 x 8 well moistened pad placed on the abdomen. Connect with the SURGING SINUSOIDAL and apply until there is good contraction. After 5 minutes, a 3 x 3 moist pad should be placed over the 4th Lumbar in place of the 4 x 8 pad on the abdomen and an additional 4 minute treatment given. It is often an advantage to use the short wave through the pelvis for 10 to 15 minutes in order to relax the surrounding tissues before using the wave current.

VARICOSE ULCERS—Treated by New Method:

Report—Journal of the American Medical Association
Extract MODERN THERAPEUTICS, September, 1936

Treatment of varicose ulcers by the introduction of the ions of acetyl-beta-methyl-choline chloride into the body (Mecholyl-Merck).

Method of treatment—Saturate a reinforced asbestos paper with a 0.5 per cent solution of the acetyl-beta-methyl-choline chloride, and wrap it around the foot and leg up to the knee. The ulcerated area is not covered during the treatment until a firm scab has formed over it; after this has occurred, the application may be made directly over the healed area also. A 4 x 8 pad electrode is placed over the wet asbestos and connected to the Positive Pole of the Galvanic Current. The electrodes are never applied to the ulcerated region. A 4 x 8 well moistened pad electrode, placed under the back and connected with the Negative Pole, is used as a dispersive electrode.

When these preliminary preparations have been completed, the current is turned on and slowly increased to twenty to thirty milliamperes. At the end of the treatment, the current is slowly reduced until turned off.

The treatment is generally given two to three times weekly for periods of twenty to thirty minutes.

VISCEROPTOSIS:

Slow sinusoidal in accordance with X-ray findings. Use 4 x 8 well moistened pad on back and 4 x 8 pad over affected area on abdomen. Current to comfortable tolerance of patient for 15 minutes three times a week.

GALVANIC AND SINE WAVE ELECTRODES

1A	Intrauterine copper electrode, large size.	
B	Intrauterine copper electrode, medium-large size.	
C	Intrauterine copper electrode, medium-small size.	
D	Intrauterine copper electrode, small size	Set of 4—$7.50
		Each 2.00
2A	Intrauterine nickel electrode, large size.	
B	Intrauterine nickel electrode, medium-large size.	
C	Intrauterine nickel electrode, medium-small size.	
D	Intrauterine nickel electrode, small size	Set of 4—$7.50
		Each 2.00
3	Urethral electrode with set of 3 copper and 3 nickel olives	6.50
4	Prolapsus electrode, nickel	4.50
5	Vaginal copper ball	2.25
6	Cervical erosion, copper	4.00
7	Hemmorrhoidal, copper	3.25
8	Rectal, nickel	2.25
9	Fibroid, perforated Copper ball	4.50
10	Zinc Ionization—Set of 3	2.25
11	Nickel ionization—Set of 3	2.25
12	Felt disc	.75
14	Nickel ball	3.00
15	Interrupting handle	3.50
16	Non-interrupting handle	2.00
17	Zinc needle	1.25
18	Flat soft copper	1.25
19	Zinc catheter wire (Bladder, zinc)	4.00
20	Copper catherer wire (Bladder, Copper)	4.00
21	Metal applicator	1.25
22	Fistula	1.25
23	Prostatic zinc	4.75
24	Prostatic, copper	4.75
25	Rubber ear speculum electrode	3.75
26	Copper nasal	4.00
27	Vaginal wave	1.25
28	Bladder ionization	4.00
29	Prostatic ionization	4.75
30	Ball tips—Set of 3	2.25

32	3″x3″ FELT PAD ELECTRODE	1.50	35	4″x4″ FELT PAD ELECTRODE	1.50
33	3″x6″ FELT PAD ELECTRODE	1.60	36	4″x6″ FELT PAD ELECTRODE	1.60
34	3″x8″ FELT PAD ELECTRODE	1.70	37	4″x8″ FELT PAD ELECTRODE	1.70

OPERATING INSTRUCTIONS

Connect Line Cord to Large Socket at Back of Machine

Using the Pads

Place pads on each side of area to be treated. In treating the chest pads may be placed anteriorly and posteriorly, or may be placed lateriorly. A knee, foot, shoulder, etc., may be treated in the same manner, or cuff type electrodes may be employed to surround the leg completely above and below the knee. Experience of the user will be guide to further desirable applications of electrodes. Once electrodes are in place, the time clock is turned on to the desired length of treatment and this automatically turns the machine on ready for operation. The Resonance dial is then turned clock wise. In most applications at some point, as the Resonance dial is advanced the hand of the meter will reach a position at which any further advance of the Resonance dial will cause the hand of the meter to drop backward. This point of maximum rightward swing of the meter hand indicates maximum resonance of the particular circuit employed on the patient with the electrodes used. If the heat at this point is too great continue turning the Resonance Control clock wise and you will note that the meter hand drops back and the amount of heat on the patient is decreased. If during the course of treatment, too much heat is developed, turn the Resonance Control further to the right to decrease the amount of heat. If this does not decrease the heat turn the Resonance Control to the left.

Using Inductance Cable

The Inductance Cable is used simply by plugging it into the terminals. On the P-225 and P-40 use the "CABLE" terminals, and turn the switch to the side marked "CABLE." Wrap the cable around the area to be treated. It may be wrapped around the trunk of the body at the chest, abdomen, shoulder or knee. The cable may also be employed by coiling in a flat pancake manner and laying this coil in a given area to be treated.

Energy is controlled to coil by the same method as used with pads. When using cable the amount is also regulated by the number of turns made around a given area, and the amount of toweling spacer used between the cable and tissue. Experience will quickly give operator necessary information as to correct dosage.

Whereas science has discovered no accurate means of measuring wattage as such, short wave length energy, with such methods as science today affords, this unit emits approximately 400 Watts of energy. In no application should all this energy be used as it is beyond the tolerance of any patient in any application. Probably never more than 175 Watts is actually ever needed for a treatment, but this great available output permits longer tube life and greater flexibility. Do not make the patient try to tolerate excessive heat. Do treat with mild heat. 15 or 20 minutes treatments, mildly warm will bring about the therapeutic results of heat more effectively than using a great deal of energy and making the area under treatment exceedingly hot.

Spacing

When using this unit the pads or cable may be applied over clothing, or directly against the skin. However, if for no reasons other than sanitary ones, it is recommended that the area to be treated be bared, then covered with a few thicknesses of dry toweling over which the electrodes or coil be applied. This will absorb perspiration, thereby tending to avoid any hot spots, due to the condenser action of drops of perspiration.

Electro Surgery

In doing electro-surgical cutting, or electro-coagulation in which a handle with selected needle point, loop, ball point, blade, etc. is affixed, one of the pads should be plugged into one terminal. The cord of the electro-surgical handle should be connected to the other terminal. The foot switch should be plugged into the foot switch socket at the back of the machine.

Do Not Turn On the Time Clock

Practically all surgery will be performed with the Resonance Control Dial set at the extreme left. Fluctuate the power by turning the Resonance Dial clock wise.

The pad should be placed at a distal point on body in relation to area on which electro-surgery is to be performed; i.e., if operated around face or upper chest or abdomen, place pad on calf of patient's leg; if operated on leg, place pad at approximately the patient's shoulder.

If doing prostatic resection in which considerable power is needed for cutting under water, the pad electrode should be placed underneath patient's buttocks. For more power, use the power control dial (clockwise).

In first becoming acquainted with electro-surgical technics, it is recommended that a piece of raw beef be experimented upon. Operator will sit on pad electrode and hold a large piece of beef in his hand, turning current off and on with footswitch and readily guiding surgical handle thru the meat with his other hand.

In practicing in this manner, the RESONANCE DIAL should first be placed at the extreme left, then gradually advanced to increase power as needed. In cutting, any of the standard makes of surgical handles with various loops, blades and points are recommended. For electrocoagulation, ball points from the very smallest size up to one-quarter inch diameter are recommended. If one is to use a very small needle point for coagulation, the Resonance dial should be kept very close to starting position, as, if considerable power is advanced, any needle point will tend to cut tissue as well as coagulate it.

Special Notes and Suggestions

1. All electro-surgical technics require the same intelligence, experience and skill as surgery performed by the usual cold, steel methods. In fact, to gain success in electro-surgical technics, the qualified surgeon should expect to employ all of his surgical knowledge, plus a special study in the use of electro-surgery. Any competent surgeon can readily learn to excel in electro-surgical technics, if he will devote adequate time and effort to mastering a new tool, which tool is, however, based upon his own surgical concepts with only a modification of reaction.
2. All treatments from a short wave machine should be employed, keeping in mind the following ideas:
   Short wave therapy differs from conventional diathermy, both in caracter and efficiency; hence, conventional diathermic technics are of little value when using short wave.
   Short wave energy creates a field between the applied eloctrodes, and the tissue that is embraced approximately within this field is effective.

   Milliamperage has little meaning in short wave therapy other than to serve as a guide to duplication of dosage when the same electrodes are used in the same circuit, on the same patient, with the same amount of spacing.

   Even then, there is some variation in the treatment, due to slight changes in the patient's chemical make up, and possibly also due to the relative humidity of treatment room at different times. The apparent milliamprerage as indicated on meter, will vary according to size of patient, size of electrodes, distance they are apart, distance between electrodes and skin surface, and as mentioned above, according to patient's chemical make up.

   Patient's comfortable tolerance still remains the most accurate guide to proper dosage. It will be found that Short Wave energy possesses the faculty of influencing gradual thermal increase in tissue, thru continued application at low current volume. Therefore, it is safer technic to begin treatments at a moderate setting of power with no increase, until 5 or 10 minutes have elapsed. This is preferred to operating the instrument at its fullest capacity immediately, necessitating a quick reduction of energy when patient complains.

   Electrodes do not have to be in firm contact, but it is recommended that they be held in snug conformity to area treated, by weighing with sand bags or elastic bandage.

   A half inch thickness of folded toweling is recomended in all applications between skin and electrodes, but in any case, at least one thickness of toweling should be used against skin as a sanitary measure and for the absorption of perspiration.

   In all treatments tell patient to warn you if there is any sensation other than pleasant warmth. Operator should always remain within room where treatment is in progress. If, perchance, he has occasion to step out of room, the patient has to be instructed that should be become uncomfortable in any way, he may either remove electrodes or reach over and turn off, or turn down the machine.
   REMOVE from the field of energy all metal objects, such as coins, keys, jewelry, pocket knives, etc., as their capacity for absorption of energy is great and may cause undue heating at point where metal may contact patient.

   If patient is treated reclining on a mattress containing inner-springs several blankets should be folded to keep electrodes away from coils within mattress. Such coils pick up electrical energy in the field and are apt to overheat. Treatment tables and chairs should be free from metal of any character.

   Take special precaution when treating areas in which the bony structures lie close to surface.

   When two electrodes are placed against body, that one which is less insulated with toweling and which is proportionately closer to tissue, will bring about the greatest heat.

   Always use an electrode larger in area than diseased part to be treated.

   Examine patient frequently to see that heat is felt at proper place and that it is not excessive.

   In using pad electrodes it is desirable in all applications to keep cords from touching each other, or permitting cords to contact metal treatment table or chair. It will cause dissipation of short wave energy and influence the meter reading, causing an error in guide to dosage.

When using the Inductance Cable, it is desirable to so coil the cable around a given area that at no place will the coil overlap itself. If it does, there will be overheating at the point of overlap, and a great portion of energy which should go to the patient will be wasted.

If machine is used in building with floor located directly against the earth, in a house or office building with large steel girders close to floor; never place electrodes on floor, as in treatment of feet, too much of the energy will be stolen by the grounding effect of the earth or heavy steel girders. In fact, in all applications, it is desirable that patient be in reclining position.

Suggestions for Positions of Pad Electrodes and Cable in Treating

Various Positions Using Pads

ANKLE:	One pad on bottom of foot; the other above knee.
KNEE:	One pad on calf; the other above knee on thigh.
HIP:	One pad under buttock; other on upper thigh.
UPPER LEG:	One pad under buttock; other on lower thigh.
WRIST:	One pad under palm of hand; other on forearm.
ELBOW:	One pad on forearm; other on biceps.
SHOULDER:	One pad on biceps; other over scapula.
NECK:	One pad laterally on each side.
CHEST:	One pad posteriorly; other anteriorly on affected area.
ABDOMINAL CAVITY:	*Same as Chest.*
MAXILLARY SINUSES:	Laterally thru head.
FRONTAL SINUSES:	One pad on frontal; other back of neck.
GENERAL BODY FEVER:	One pad under shoulder, other over thighs.
HYPERTENSION:	*Same as General Body, but without patient in bag or blanket.*

Treating Prostate and Scrotum

Place the pad electrode on each thigh, just above knees, with patient comfortably seated in chair. Energy will be found to concentrate thruout lower pelvis and scrotum generating quite considerable quantities of heat. Another way is to have patient sit on one of the pads, with the other one placed anteriorly over lower pelvis. The female pelvic area may be treated in the same manner as suggested above.

Using the Cable

The Inductance Cable may be used for any of the above areas by merely taking 2 or 3 turns around area to be treated.

It is claimed that whereas the pads heat the tissue by one method, electro-magnetic induction heats the field by another method. Some authorities claim there are benefits of one method of treatment over the other. This probably cannot be proved at the present time, but each individual operator may discover for himself whether he prefers to use pads or cable. In any case we suggest that the operator use the most convenient type of electrode.

In treatment of the small of the back, or treatment of the rectum, or prostatic area, coil cable in a pancake manner, having patient rest area on the pan-cake coil, then operate cable as previously outlined. In many treatments this will be found to be very effective.

GUARANTEE

This Garfield Short Wave is guaranteed to be free from electrical and mechanical defects. Should any mechanical defects develop within two years from the date of purchase, the apparatus will be repaired free of charge provided same is shipped prepaid to the GARFIELD MEDICAL APPARATUS CO.

TUBES are guaranteed by the tube manufacturer for 1,000 hours. For purposes of adjustment 1,000 hours shall be construed as six (6) months of service. If replacement is made, purchaser is to be charged and agrees to pay 1/6 of the current retail price of the new tube for each month or fraction thereof which has elapsed since the date of purchase of the equipment to the date claim is made.